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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/461,756	12/16/1999	HIROYUKI KANO	9438-0014-2	4231

7590

08/26/2002

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EXAMINER

BAUMEISTER, BRADLEY W

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 08/26/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Advisory Action

Application No.
09/461,756

Applicant(s)
Kano

Examiner
B. William Baumeister

Art Unit
2815



-- Th MAILING DATE of this communication appears on th cover sheet with the correspondence address --

THE REPLY FILED Aug 16, 2002 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE. Therefore, further action by the applicant is required to avoid the abandonment of this application. A proper reply to a final rejection under 37 CFR 1.113 may only be either: (1) a timely filed amendment which places the application in condition for allowance; (2) a timely filed Notice of Appeal (with appeal fee); or (3) a timely filed Request for Continued Examination (RCE) in compliance with 37 CFR 1.114.

THE PERIOD FOR REPLY [check only a) or b)]

- a) ☒ The period for reply expires 3 months from the mailing date of the final rejection.
- b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection. ONLY CHECK THIS BOX WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

1. ☐ A Notice of Appeal was filed on _____. Appellant's Brief must be filed within the period set forth in 37 CFR 1.192(a), or any extension thereof (37 CFR 1.191(d)), to avoid dismissal of the appeal.
2. ☐ The proposed amendment(s) will not be entered because:
- (a) ☐ they raise new issues that would require further consideration and/or search (see NOTE below);
- (b) ☐ they raise the issue of new matter (see NOTE below);
- (c) ☐ they are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or
- (d) ☐ they present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: _____

3. ☐ Applicant's reply has overcome the following rejection(s): _____

4. ☐ Newly proposed or amended claim(s) _____ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).

5. ☒ The a) ☐ affidavit, b) ☐ exhibit, or c) ☒ request for reconsideration has been considered but does NOT place the application in condition for allowance because:
SEE ATTACHMENT

6. ☐ The affidavit or exhibit will NOT be considered because it is not directed SOLELY to issues which were newly raised by the Examiner in the final rejection.

7. ☒ For purposes of Appeal, the proposed amendment(s) a) ☐ will not be entered or b) ☒ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.

The status of the claim(s) is (or will be) as follows:

Claim(s) allowed: _____

Claim(s) objected to: _____

Claim(s) rejected: 1-4, 7, 8, 10, 11, 13-18, 20, and 21

Claim(s) withdrawn from consideration: 5, 6, 9, 12, 19, and 22-31

8. ☐ The proposed drawing correction filed on _____ is a) ☐ approved or b) ☐ disapproved by the Examiner.

9. ☐ Note the attached Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____

10. ☐ Other: _____

EDDIE LEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2000

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DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 8/16/2002 have been fully considered but they are not persuasive.

a. Applicant has argued that a 1/4-wave reflection superlattice (a superlattice designed such that its respective barriers and wells have thicknesses which are equal to odd multiples of a wavelength λ , designed for increased carrier reflection) will not inherently function as a 1/2-wave transmission superlattice for some alternative wavelength of a higher energy.

b. As an initial matter, the Examiner notes that Applicant has stated, "[t]he outstanding Office Action takes the position that the voltage of the Takagi device can be adjusted to change the wavelength λ and obtain a structure with layers having thickness that are multiples of $\lambda/2$." (REMARKS, page 3, lines 3-.) To clarify the record, the Examiner's notes that the voltage or voltage source is not part of the claimed device. Rather, the device claims are directed towards the superlattice structure and various other semiconductor layers. As such, it is technically more appropriate to state that the examiner's position was/is: "that a voltage that is applied to the Takagi device can be adjusted..."

c. Turning to the merits of the argument, Figure 3 of Takagi depicts a reflectivity vs. electron energy curve for a 1/4-wave superlattice that is designed to reflect carriers around the 630 nm band. The figure superimposes this curve over a dashed reflectivity-energy curve that is produced by a bulk semiconductor region. The bulk semiconductor curve shows that total

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reflection is obtained until the carrier energy is increased to the level U_0 , which is the conduction band edge of the bulk semiconductor. As the energy is further increased above this energy, the reflectivity tapers to about 30%, indicating partial transmission and partial scattering/reflection of carriers above the the conduction band energy. Alternatively, the superlattice curve indicates that carriers are totally reflected at energies above the classical barrier U_0 , but that as the energy is increase even further, the $1/4$ wave conditions are eventually not met and the reflectivity decreases. Moreover, the curve further depicts that the reflectivity periodically decreases all the way to 0%, or restated, the transmission periodically increases to 100%. This condition necessarily occurs--and can only occur--when the wavelength of the carriers satisfy the $1/2$ wave conditions that are claimed. Thus, Takagi not only supports the Examiners position that this phenomenon is inherent to the superlattice structure, but additionally teaches that a $1/4$ -wave superlattice was actually biased to operate in this regime. Accordingly, the outstanding rejections are still deemed to be proper and are maintained.

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INFORMATION ON HOW TO CONTACT THE USPTO

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to the examiner, **B. William Baumeister**, at (703) 306-9165. The examiner can normally be reached Monday through Friday, 8:30 a.m. to 5:00 p.m. If the Examiner is not available, the Examiner's supervisor, Mr. Eddie Lee, can be reached at (703) 308-1690. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0956.

B. William Baumeister

Patent Examiner, Art Unit 2815

August 22, 2002



EDDIE LEE
SUPERVISORY PATENT EXAMINER
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